

Teacher Candidates' Behaviors towards Environment and Some Factors Affecting Them

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ABSTRACT

The purpose of this study is to depict the behaviors of teacher candidates with regard to the environment and to determine how gender, grade level, department and the place within they grew affect these behaviors. The study was carried out with the participation of 457 teacher candidates. Only first and fourth grade teacher candidates were participated in the study. The participants were from departments of social studies education, pre-school education, science education, Turkish education, mathematics education and primary school teaching education in a state university in Southern Turkey. The data were collected in the spring of 2017-2018 with the 'Environmental Behavior Scale' developed by Goldman, Yavetz and Pe'er and adapted to Turkish by Timur and Yilmaz (2013). The results indicate that gender is an effective factor on environmental behaviors. The environmental behaviors of female teacher candidates are significantly positive than those of male prospective students. The increase of class level positively affects the environmental behaviors as well. Finally, the teacher candidates from pre-school education department demonstrated significantly positive behaviors in at least one dimension of the scale used in this study. It has also come out that the size of the settlement area does not create significant difference on the environmental behaviors of teacher candidates.

Keywords: teacher candidates, social studies, environmental behavior, environmental literacy

INTRODUCTION

The environment is a biological, physical, social, economic and cultural environment in which living things maintain relationships and interact with each other throughout their lives (Açıkgoz & Arcak, 2012: 130). In other words, the environment is regarded as human biosphere because all of the changes at natural conditions such as air, water and soil, i.e. the flora and fauna that develop in the "ecological parcel", ultimately affect the human being (Akman, Düzenli, & Geven, 1996: 7).

Since mankind has existed, he has used all the resources of the world in his favor. The notion of property and the concept of land, which emerged as a result of sedentism, led people to expect more from nature. People have begun to ask for more than they can obtain from the nature. These requests increased continually. As a result of these demands, the ecological balance has deteriorated considerably and "environmental pollution", which is one of the biggest problems of our time, has emerged. Environmental pollution can be defined as; "The increase in the amount of certain substances in the environment which affects negatively human life" (Akdur, 2005: 15). Velasquez (2011) defines pollution as "Pollution is the introduction of contaminants into an environment that causes instability, disorder, harm or discomfort to the ecosystem i.e., physical systems or living organisms" (p. VII).

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According to Kılıç (2006), the reason for the environmental crisis that modern society experiences is a human-centered worldview that does care about nature and environment.

In the past environmental pollution was ignored in the name of economic development. The industrial revolution, which started in England in the 18th century and then affected the whole world, caused great damage to the environment, though there is a great development in the name of humanity. The environmental cost of economic development has been neglected for many years under the influence of the industrialists, and the environment and natural resources are regarded as only “raw material” and / or “sink” (Aksu, 2011: 29; Beckerman, 1992; Gwartney, Lawson, & Holcombe, 1999; Stern, Common, & Barbier, 1996). These environmental problems, which started to show their effects especially in the 20th century, continue as of today.

Some of the leading facts and events that disrupt the ecological balance and make the world uninhabitable can be listed as intensive energy use, destruction of forests, intensification of some substances in the human environment, production of some artificial materials which do not exist in nature, and intensive use of artificial fertilizer (Akdur, 2005). Prevalence of these pollutants is a sign that people are betraying the planet they live on and that the world will become unlivable unless behaviors of people change.

The ideas that natural resources are infinite and the nature is humankind's slave, which will be at his disposal forever, give place to a different thought recently. Environmental problems, which were seen as regional problems, are beginning to be seen as a global problem. Because the problems identified as local or regional are ultimately leading to global damage, such as in the depletion of the ozone layer or in the change of world climate (Kaplan, 1999: 42). Along with the globalization of these problems, many treaties and conferences were held. Countries have come to realize that they must act together to safeguard the world they live in because the nature that satisfied was in the danger of depletion in the future. That is why the world needs to learn how to use and manage resources in the right way.

The seriousness of the environmental problems arising from human behavior has begun to be pronounced in 1960s, and efforts to prevent it have increased gradually (Altunok, 2013: 39). The most important concept introduced for this purpose is the concept of “Sustainable Development”. The concept of Sustainable Development introduced firstly in World Nature Charter document adopted in 1982 by the International Union for Conservation of Nature (IUCN) and took its final shape in 1987 in Brundtland Report published by the World Commission on Environment and Development. Sustainable development can be described most generally as “development that can meet today's needs without compromising the ability of future generations to meet their own needs” (Brundtland Report, 1987). The “Brundtland Report” has given us important clues as to how to realize a neat and healthy living environment without destroying our planet. In addition, as important outputs of Conference on Environment and Development in June 1992, both “Rio Declaration” and the “Agenda 21”, which is the implementation document of the declaration principles, set the same goals more concretely as continuation and complementary of “Brundtland Report” (1987). The conclusions of the Rio Summit have also affected the agenda of all subsequent United Nations (UN) meetings. International Conference on Population and Development held in Cairo in 1994, World Summit for Social Development held in Copenhagen in 1995, United Nations Conference on Human Settlements -Habitat II held in Istanbul in 1996, The Millennium Summit held in New York in 2000, the World Summit on Sustainable Development held in Johannesburg in 2002, United Nations Development Programme held in Cape Town in 2006 are the main ones of these meetings (Baykal & Baykal, 2008: 10).

All these conferences and meetings contributed a lot to creation of consciousness about to pollution which resulted in important actions. They gave way to important developments in the areas of replacing existing technological facilities with environmentally friendly ones and using natural resources in a logical and economical way (Alagöz, 2007: 51), the control of the pollutants thrown into the environment; detection of pollution types and their concentrations and search for solutions; the elimination of existing pollution and the prevention of recontamination (Aras, 2001). However, it is known that the real purpose is to maintain those measures. The way to achieve this is through education. Educating the individuals is important because global environmental problems can also be expressed as a sum of individual behaviors. An educated individual is the one who has become aware of himself and his environment. According to Erten (2006), education should develop attitudes, value judgments, knowledge and skills to protect the environment, and should foster demonstration of environmentally friendly behaviors. While education activities about environment aim to acquisition of the necessary cognition, affections and behaviors towards the environment, personality development processes such as experiencing, active participation and responsibility are important outcomes as well. An education about environment should be understood as a general area where the ability to live in

harmony with the environment and is acquired rather than a specific part and a topic of the general education series (Özdemir, 2007: 25). Since the main source of environmental pollution is feelings and thoughts that motivate humans to faulty and destructive behavior; what is expected from education is to lay the groundwork for promoting sensitive and logical actions towards the environment (Ayvaz, 1996: 6). Environment is an important factor at education of pupils (Vurgun, 2017). Teachers equipped with environmental education are also needed for a good environmental education, because the biggest task in education falls on to teachers. Teachers are role models of learners. According to the Social learning theory, even if they are unaware, most of the time students adopt the behaviors of the teachers and try to be like them.

Originally introduced by Miller and Dollard (1941) social learning theory was developed by Bandura (1977, 1986). One of the concepts of the theory of this theory is the modeling. Rodríguez-Campos and Bombly (2009) describe modeling as teachers' showing correct and appropriate behaviors, and students' observing, adopting and practicing them. Based on this theory, every teacher who behaves erroneously causes erroneous behaviors in students. Teachers should not be just people who provide environmental education but also they should be persons who act according to what they know and teach. There is, of course, no certainty in the social learning theory that the student will take the behavior of the teacher. However, it should not be forgotten that the teacher is a big factor. Because actions of people are the main cause of environmental problems, human behaviors, habits and thoughts are the greatest indicators of what will happen to the environment in the future. In order to develop a capacity of understanding and interpreting environmental systems, and appropriate behaviors to maintain, restore or improve environmental systems (Roth, 1992: 1, as cited in Aksoy, Karatekin, 2012: 1424) environmental education should be given to the student correctly and permanently.

There are already existing studies in the literature about the behaviors of teachers and prospective teachers regarding environment. For example; Teksoz, Sahin and Ertepınar (2010) concluded in their work that teacher candidates have environmental awareness and positively directed environment-oriented thinking. Studying with the teacher candidates about their knowledge, attitude and behavior towards the environment, Sargin et al. (2016) found that teacher candidates had high environmental sensitivities and even changed their habits to contribute to the solution of environmental problems. In their study where environmental literacy levels of prospective teachers are investigated, Aksoy and Karatekin (2012) found that there was no effect of the level of income on the environmental literacy of the prospective teachers, while gender, level of environmental curiosity, presence of environmentally sensitive individual in the family, frequency of presence in natural areas, and environmental education courses in universities are influential. Esa (2010) stated that biology teacher candidates do not demonstrate environment friendly behaviors, although they are informed about environmental concepts. Spiropoulou, Antonakaki, Kontaxakaki, and Bouras (2007) revealed that primary teacher candidates are willing to save the environment but their limited knowledge about environment keeps them from acting properly. Liarakou, Gavrilakis, and Flouri (2009) argued that teachers refrain from adopting clear position with regard to environmental issues even though they have necessary knowledge. Hsu and Roth (1998) found that teachers in Taiwan have positive attitudes towards the environment. Goldman et al. (2006) and Pe'er, Goldman, and Yavetz (2007) revealed that pre-service teachers in Israel have limited knowledge of environmental literacy which results in some negative environmental behaviors. Stir (2006) found that teacher candidates are interested highly in environmental issues but they have lack of confidence with regard to taking proper actions. Boubonari, Markos, and Kevrekidis (2013) concluded that Greek teacher candidates Show moderate limited action and limited collective action to towards pollution. Since the issue is very important we thought that investigation of the subject in a different time period and with participation of a different sampling group is important. Responsible actions towards the environment may include a variety of actions (Sia, Hungerford, & Tomera, 1986). These categories may include ecomanagement, consumerism, persuasion, political action and legal action (Hsu, 2004; Hungerford & Peyton, 1980; Sia et al., 1986). On the other hand, Goldman et al. (2006) specified six dimensions that are investigated in our current study.

Purpose of the Research

The purpose of this study is to reveal behaviors of teacher candidates with regard to the environment, and to determine how these behaviors are affected by their gender, grade level, department and size of the settlement in which they grew up.

The study focuses on the following questions:

1. Is the size of the settlement where the teacher candidates grew up effective on the teacher candidates' behavior towards the environment?

2. Is gender effective on the teacher candidates' behavior towards the environment?
3. Is grade level effective on the teacher candidates' behavior towards the environment?
4. Is department effective on the teacher candidates' behavior towards the environment?

Significance of the Research

Because the environment means life for people, protecting the environment is a very important issue. As seen above, many conferences, notifications, reports and summit meetings were held on the environment. But the greatest impact on the environment can be with education. It is thought that this research can determine some of the factors that are effective on determining the environmentally oriented behaviors of the prospective teachers. This study will also provide an opportunity to make comparisons with results of earlier studies enabling us to see changing or continuing trends. It will also test findings of earlier studies in a different time and with different participants. Finally we believe that this research will contribute to the development of environmental education given in classrooms.

METHOD

In this section, the model of the research, the universe and the sample, the data collection tools, the collection of the data and the analysis of the data will be discussed.

Design of the Research

The study was carried out by means of quantitative research methods and it is a descriptive study. According to Fraenkel, Wallen and Hyun (2012), descriptive studies define a particular situation as complete and as precise as possible. The most commonly used descriptive research method in educational research is survey (Fraenkel et al., 2012). General survey models are survey arrangements trying to reach a general judgement about a population by focusing either population as a whole or on a group or sample that will be taken from the population when it consists of too many units (Karasar, 2012: 79).

Sampling

The target population of the study consists of teacher candidates who receive training in departments of primary school teaching, social studies education, pre-school education, Turkish education, mathematics education, and science education. All of the participants were either in the 1st grade or in the 4th grade.. The sample was formed through convenience sampling. All of the accessible population were tried to be included, but the study was conducted only with the teacher candidates who attended the classes during the implantation of data collection instrument.

321 of the participants were female and 130 were male. 6 participants did not report their gender. There are 227 prospective teachers in the first grade and 230 prospective students in the fourth grade. As the environment they grew up, 79 of the participants reported as "village", 76 of them as "town" and 293 of them as "city". 9 participants did not declare where they grew up. 74 of them were from in social studies education department, 60 of them were from mathematics education department, 50 of them were from pre-school education department, 158 of them were primary school teaching department, 62 of them were from science education department, and 53 of them were from Turkish education department.

Data Collection Tool

In accordance with the purpose of the study, 'Environmental Behavior Scale' originally developed by Goldman et al. (2006) and adapted to Turkish by Timur and Yilmaz (2013) was used. The scale consists of 20 items and is prepared in five point likert type. Validity and reliability studies of the original scale were carried out by Goldman et al. (2006) and Timur and Yilmaz (2013) showed that the scale is also valid in terms of Turkish culture. In terms of reliability, Cronbach's Alpha reliability coefficient calculated by Timur and Yilmaz (2013) for the whole data collection instrument is .85. In this study Cronbach's Alpha coefficient was found as .86. The scale was collected under 6 factors. These factors are; RCAEBP (Resource Conservation Activities for the Economic Benefit of the Person), ESC (Environmentally Sensitive Consumer, LARN (Leisure Activities Related to Nature), RE (Recycling Efforts), RC (Responsible Citizenship) and EA (Environmental Activism). In study of Timur and Yilmaz (2013) Cronbach's Alpha coefficient values for the factors are as follows: RCAEBP=.68; ESC=.66; LARN=.70; RE=.63; RC=.68; and EA=.57. For the current study we have

Table 1. Skewness and Kurtosis Values of Data

RCAEBP	Skewness	-.963
	Kurtosis	.233
ESC	Skewness	-.411
	Kurtosis	.564
LARN	Skewness	-.266
	Kurtosis	-.199
RE	Skewness	-.131
	Kurtosis	-.555
RC	Skewness	-.036
	Kurtosis	-.303
EA	Skewness	.350
	Kurtosis	-.559

found these values as RCAEBP=.60; ESC=.60; LARN=.70; RE=.60; RC=.67; and EA=.72. The first part of the questionnaire included information on class, department, gender and place of growing up.

Their study group consisted of teacher candidates as being done in our study. Thus, although the sample has been changed the main characteristics of the participants are the same: teacher candidates. However we have looked at item statistics. According to Item Total statistics deletion of any item does not raise total reliability score considerably. Corrected Item-Total Correlations has revealed that score of item 14 is .018 and can be considered for removal. However we preferred to keep this item on the ground that removing it may create concerns for validity of the research instrument.

In order to control construct validity of the instrument we applied to Confirmatory Factor Analysis. Scores for the fitness of the model were as follows: $\chi^2/df = 2,348$, $df=154$; $p<0.001$; GFI=.92; NFI=.90 IFI=.94; CFI=.94; RMSEA=.054. Values between 0.90 and 0.95 for the indices of NFI, GFI, and CFI are acceptable values (Bentler & Bonett, 1980; Hooper et al., 2008). For IFI scores any value above .90 is acceptable (Şimşek, 2007; Sümer, 2000). For RMSEA values any value between 0.80 and 0.05 is acceptable (Byrne & Campbell, 1999; Steiger, 2007). Thus it is possible to conclude that the construct of the research instrument is structurally valid.

Analysis of Data

For the analysis of the data, independent samples t-test and Multivariate analysis of variance (MANOVA) were used.

First, it was checked whether the data were normally distributed. It is understood that the data are not normally distributed according to the test results. However, it can be seen from **Table 1** that the values of skewness and kurtosis are at the feasible level of parametric tests.

If skewness and kurtosis values are between +2 and -2 the distribution was considered normal according to George and Mallery (2010); Tabahnick and Fidell (2013) considered values between +1.5 and -1.5, and Karasar (2014) +1.96 and -1.96 as normal. As shown in **Table 1**, the distribution was considered normal and parametric tests were applied since the values of skewness and kurtosis in our study remained within the stated limits.

FINDINGS

Overview of Teacher Candidates' Behavior towards The Environment

According to **Table 2**, pre-service teachers demonstrate quite positive behaviors with regard to RCAEBP (Resource Conservation Activities for the Economic Benefit of the Person) dimension. It was observed that pre-service teachers showed moderate positive behaviors in the dimensions of ESC (Environmentally Sensitive Consumer), RE (Recycling Efforts) and LARN (Leisure Activities Related to Nature) dimensions. However, it was understood that the behaviors of prospective teachers were quite low in RC (Responsible Citizenship) and EA (Environmental Activism) dimensions.

Table 2. Average Scores About Teacher Candidates' Behavior Towards Environment

	N	Minimum	Maximum	Mean	Std. Deviation
RCAEBP	457	1.00	5.00	4.33	.80990
ESC	457	1.00	5.00	3.80	.81284
LARN	457	1.00	5.00	3.47	.76624
RE	457	1.00	5.00	3.26	.87227
RC	457	1.00	4.60	2.82	.70916
EA	457	1.00	5.00	2.47	1.00860
Valid N (listwise)	457				

Table 3. Independent Samples T-Test Results Based on Gender of Teacher Candidates

	Group	N	\bar{x}	SD	df	T	P
RCAEBP	Female	321	4.38	.68	449	3.49	.001*
	Male	130	4.10	.81			
ESC	Female	321	3.94	.79	449	5.55	.000*
	Male	130	3.49	.73			
LARN	Female	321	3.48	.77	449	.67	.531*
	Male	130	3.43	.74			
RE	Female	321	3.32	.87	449	2.34	.020*
	Male	130	3.11	.86			
RC	Female	321	2.88	.69	449	2.81	.005*
	Male	130	2.67	.72			
EA	Female	321	2.51	.99	449	1.37	.171*
	Male	130	2.37	1.03			

*p<0.05

Findings Related To Gender Variable

The data on whether there is a significant difference between the environmental behavior scores of male and female teacher candidates depending on gender variable.

According to **Table 3**, the difference between the average scores of female and male prospective teachers is statistically significant in terms of RCAEBP (Resource conservation activities for the economic benefit of the person) [$t_{(449)}=3.49$, $p<.05$]. Similarly, environmental behavior score averages of male and female teacher candidates were also found statistically significant in terms of ESC (Environmental Sensitive Consumer) [$t_{(449)}=5.55$, $p<.05$] dimension; RE (Recycling Efforts) [$t_{(449)}=2.34$, $p<.05$]; dimension and RC (responsible citizenship) [$t_{(449)}=2.81$, $p<.05$] dimension. According to this, female teacher candidates are more active in protecting the resources for the economic benefit of the individual ($\bar{x}=4.38$) than male teacher candidates ($\bar{x}=4.10$). The female teacher candidates ($\bar{x}=3.94$) are more sensitive to the environment than the male candidate teachers are ($\bar{x}=3.49$). Female teacher candidates ($\bar{x}=3.32$) show more recycling efforts than male teacher candidates do ($\bar{x}=3.11$). It is also understood that female teacher candidates ($\bar{x}=2.88$) show more responsible citizenship behaviors than male teacher candidates do ($\bar{x}=2.67$).

Findings Related to Grade Variable

The data on whether there is a meaningful difference between the environmental behavior scores of male and female teacher candidates in term of grade is presented in **Table 4**.

Table 4. Independent Samples T-Test Results Based on Grades of Teacher Candidates

	Grade	N	\bar{x}	SD	df	T	P
RCAEBP	1 st	227	4.20	.86	455	3.38	.001 *
	4 th	230	4.45	.73			
ESC	1 st	227	3.64	.83	455	4.61	.000 *
	4 th	230	3.98	.75			
LARN	1 st	227	3.29	.75	455	5.20	.000 *
	4 th	230	3.65	.73			
RE	1 st	227	3.17	.87	455	2.02	.043 *
	4 th	230	3.34	.86			
RC	1 st	227	2.68	.65	455	4.16	.000 *
	4 th	230	2.95	.73			
EA	1 st	227	2.31	.96	455	3.45	.001 *
	4 th	230	2.63	1.0			

*p<0.05

Table 5. MANOVA Results According to the Departments and Settlement Places of Teacher Candidates

Dependent variables	Wilk's Λ	F	Hypothesis sd	Error sd	p	η^2
department	0,89	1,75	30	1786	0,007	0,023
settlement	0,98	0,53	12	880	0,893	0,007

According to **Table 4**, the difference between the mean scores of the first grade prospective teachers and the fourth grade teacher candidates is statistically significant in terms of the RCAEBP [$t_{(449)}=3.51$, $p<.05$]. Likewise, the difference between the environmental behavior score averages of first grade prospective teachers and fourth grade prospective teachers is statistically significant in terms of dimensions of ESC [$t_{(449)}=4.61$, $p<.05$], RE [$t_{(449)}=2.02$, $p<.05$], and RC [$t_{(449)}=4.16$, $p<.05$]. According to this, the teacher candidates ($\bar{x}=4.41$) who are studying in the 4th class demonstrate more resource conservation activities for the economic benefit of the person than the first class teacher candidates ($\bar{x}=4.17$) do. Prospective teachers in the fourth grade ($\bar{x}=3.98$) are more sensitive to the environment than the first-grade prospective teachers are ($\bar{x}=3.64$). Prospective teachers in the fourth year ($\bar{x}=3.34$) show more recycling efforts than the first-year prospective teachers do ($\bar{x}=3.17$). Prospective teachers in the 4th grade ($\bar{x}=2.95$) showed more responsible citizenship behavior than the prospective teachers in the 1st grade do ($\bar{x}=2.68$). In addition, prospective teachers ($\bar{x}=2.63$) in the 4th grade exhibited more environmental activism than the first class teacher candidates do ($\bar{x}=2.31$).

Findings Related To Department and Settlement Variables

We have analyzed average scores of teacher candidates based on their department and settlement they live by using multivariate analysis of variance (MANOVA) and findings are presented in **Table 5**.

According to **Table 5**, there was a statistically significant difference in behaviors of teacher candidates based on their department [Wilks' $\lambda=0.89$, $F(30, 1786)=1.75$, $\eta^2=0.023$, $p<0.05$]. However there wasn't a statistically significant difference in behaviors of teacher candidates based on their settlement [Wilks' $\lambda=0.98$, $F(12, 880)=0.53$, $\eta^2=0.007$, $p>0.05$].

In order to determine the source of the difference we have run tests of between-subjects effects and the results are presented in **Table 6**.

Table 6. Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Department	ESC	9.446	5	1.889	2.919	.013	.031
	LARN	5.940	5	1.188	2.047	.071	.022
	RE	3.479	5	.696	.914	.472	.010
	RC	4.440	5	.888	1.781	.115	.019
	EA	6.637	5	1.327	1.309	.259	.014
	RCAEBP	6.552	5	1.310	2.020	.075	.022
Error	ESC	291.836	451	.647			
	LARN	261.786	451	.580			
	RE	343.470	451	.762			
	RC	224.886	451	.499			
	EA	457.243	451	1.014			
	RCAEBP	292.555	451	.649			

Table 7. Tukey HSD Test Results for the Source of Difference According to the Department

Dependent Variable	(I) Department	(J) Department	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
						Lower Bound
						Upper Bound
ESC	pre-school education	social studies education	.4401*	.14726	.035	.0187 .8616
		mathematics education	.2889	.15403	.419	-.1520 .7297
		primary school teaching	.3861*	.13053	.038	.0125 .7596
		science education	.3172	.15290	.303	-.1204 .7548
		Turkish education	.5548*	.15859	.007	.1009 1.0087

We can see from this table that department has a statistically significant effect on only ESC ($F_{(5, 451)} = 2.919; p < .05$; partial $\eta^2 = .031$). Since the value we have found in Levene's Test of Equality of Error Variances was 0.094 we have decided to run a Tukey HSD test for post-hoc analysis. The results are presented in **Table 7**.

Table 7 shows that for mean scores for ESC were statistically significantly different between pre-school education and social studies education ($p < .0005$), pre-school education and primary school teaching ($p < .0005$), and pre-school education and Turkish education ($p < .0005$)

DISCUSSION AND CONCLUSION

The first findings of the study indicate that teacher candidates demonstrate quite positive behaviors towards the environment. Although their average scores of "responsible citizenship" and "environmental activism lower than expected it is not surprising. Turkish university students may refrain from activism (Avaroğulları, 2016). Even though it is environmental activism people may prefer to stay away.

The main findings from the study were: gender is an influential factor on environmental behavior; the increase in class level positively affects the environmental behavior; the pre-school teacher candidates show positive behaviors in at least one dimension in compare to the teacher candidates from other departments, and the size of the settlement is not effective enough to make a significant difference on the environmental behavior of teacher candidates. These results will be handled and discussed respectively below.

First of all, gender has been seen as an effective factor in some dimensions of environmental behavior. Female teacher candidates show more positive behaviors than male teacher candidates. We can say that this is an expected situation. In many studies, including Koç and Karatekin (2013), Timur, Yilmaz and Timur (2013), Aksoy and Karatekin (2012), Kayalı (2010), Çabuk and Karacaoğlu (2003), Kahyaoğlu, Daban and Yangın (2008), Ek, Kılıç, Öğdüm, Düzgün, Şeker (2009) and Kayalı (2018), it has been shown that women are

more sensitive to the environment than men. This study has reached similar results. But what might be the underlining fact that women have more positive attitudes towards the environment? One reason for this may be gender roles. Feminine gender roles are often characterized by tenderness, understanding, emotionality, dependency; while masculine gender roles are characterized by leadership, dominance, and independence. (Çüceloğlu 2006, as cited in Zara and Özdemir 2013). Because of these gender roles, men may be more apathetic, as women are more dependent on their surroundings and more sensible to their environment.

Güneş (2013), on the other hand, argues that environmental problems such as climate change have a direct impact on domestic responsibilities traditionally seen as appropriate for women. Activities such as clean food supply, access to clean water and heating are seen as appropriate for females and are directly affected by environmental pollution. Thus women may see results of environmental pollution first more clearly and arrange their behaviors accordingly. From another point of view, researches reveal that the most important element of environmental consciousness, "responsibility towards nature", is reflected instinctively by the behaviors of women in particular because of their nature (Akt & Güneş, 2013; Kabaş, 2004). It can be said that due to this instinctual approach, the women is sensitive to her environment without being aware of it.

As a result of the research, it is seen that the teacher candidates who are studying at the 4th grade level are more sensitive to the environment than the 1st grade students are. These findings support the findings of previous studies. In a study conducted by Çabuk and Karacoglu (2003), it was observed that the 4th grade teacher candidates were more sensitive to environment. Likewise, Ek, Kılç, Öğdüm, Düzgün, and Şeker (2009) reached the results parallel to the findings of this study. It can be argued that this difference between 1st and 4th grades is based on the fact that fourth grade students developed personally more than first grade teacher candidates do, and that they are more aware of the threats towards the environment due to their longer training period.

It is seen that pre-school teachers are more environmentally conscious consumers than teacher candidates in other departments. They are followed by departments of mathematics, science, primary school teaching, social studies and Turkish. Çabuk and Karacaoglu (2003) also achieved parallel results in their study. It is thought that such a difference may arise from the teaching program applied in preschool department. When the curriculum is examined, it is determined that there are courses related to environmental education in pre-school education department. A course named "Early Childhood Environmental Education" is compulsory in the pre-school education department and a course named "Sustainable Development and Education" is taken electively. These courses may have caused them to exhibit more sensitive behaviors.

As a result, it is understood that there is a need to focus on male teacher candidates in order to achieve teachers who exhibit environmentally-sensitive, role model behaviors for students. The fact that 4th grade students exhibit more positive behaviors than 1st grade students do is a positive finding. It means that the training given in the education faculty is effective to some degree. Environment-oriented courses offered in the pre-school education department seem to cause students in this department to behave more positively than other students do. Especially active participation of students may raise consciousness (Durmaz & Kiriş Avaroğulları, 2016) In this case; it may be effective to offer similar compulsory or elective courses for other departments, especially for departments of science education and social studies education which deals with environmental education greatly.

Disclosure statement

No potential conflict of interest was reported by the authors.

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REFERENCES

- Açıköz, E., & Arcak, S. (2012). Ekoloji ve Çevre Bilgisi, Eskişehir: *Anadolu Üniversitesi Açıköğretim Fakültesi Yayıncı*, 1349.
- Akdur, R. (2005). Avrupa Birliği ve Türkiye'de Çevre Koruma Politikaları "Türkiye'nin Avrupa Birliğine Uyumu", Ankara: *Ankara Üniversitesi Avrupa Topluluğu Araştırma Ve Uygulama Merkezi Araştırma Dizisi*, 23.
- Akman, Y., Düzenli, A., & Geven, F. (1996). *Çevre Kirliliği ve Ekolojik Etkileri*, Ankara.
- Aksoy, B., & Karatekin, K. (2012). Sosyal Bilgiler Öğretmen Adaylarının Çevre Okuryazarlık Düzeylerinin Çeşitli Değişkenler Açısından İncelenmesi, *International Periodical for the Languages, Literature and History of Turkish or Turkie*, 7(1), 1423–1438.
- Aksu, C. (2011). *Sürdürülebilir Çevre ve Kalkınma*, Denizli: Güney Ege Kalkınma Ajansı.
- Alagöz, B. (2007, September 10-15). Çevre Sorunları, Teknoloji ve Değişen Öncelikler. Paper presented at *38th Uluslararası Asya Ve Kuzey Afrika Çalışmaları Kongresi (ICANAS)*, Ankara, 43-52.
- Altunok, A. E. (2013). Sürdürülebilir kalkınma'nın sürdürülemezliği, *Denetşim*, (12), 39-44.
- Aras, O. N. (2001) Çevre Kirliliğinin Makro-Ekonominik Analizi ve Yönetimi. Paper presented at *İnsan ve Felaketler Uluslararası Konferansı*, Baku, 392-400.
- Avaroğulları, M. (2016). An Investigation about democratic participation of social studies teachers and teacher candidates. *Uluslararası Sosyal Arastırmalar Dergisi*, 9(43), 1377-1388. <https://doi.org/10.17719/jisr.20164317708>
- Ayvaz, Z. (1996) Çevre Eğitime Giriş. *Ekoloji ve Çevre Dergisi*, 6(21), 5-6.
- Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1986). *Social Foundations Of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Baykal, H., & Baykal, T. (2008). Küreselleşen Dünya'da Çevre Sorunları. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 5(9), 1-17.
- Beckerman, W. (1992). Economic growth and the environment: whose growth? whose environment? *World Development*, (4), 481. [https://doi.org/10.1016/0305-750X\(92\)90038-W](https://doi.org/10.1016/0305-750X(92)90038-W)
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588-600. <https://doi.org/10.1037/0033-2909.88.3.588>
- Boubonari, T., Markos, A., & Kevrekidis, T. (2013). Greek Pre-Service Teachers' Knowledge, Attitudes, and Environmental Behavior Toward Marine Pollution. *Journal of Environmental Education*, 44(4), 232–251. <https://doi.org/10.1080/00958964.2013.785381>
- Brundtland, G. (1987). *Our common future [The Brundtland report]*. Retrieved on 18 March 2019 from <http://www.un-documents.net/our-common-future.pdf>
- Byrne, B. M., & Campbell, T. L. (1999). Cross-cultural comparisons and the presumption of equivalent measurement and theoretical structure: a look beneath the surface. *Journal of Cross-Cultural Psychology*, 30, 555-574. <https://doi.org/10.1177/0022022199030005001>
- Çabuk, B., & Karacaoğlu, C. (2003) Üniversite Öğrencilerinin Çevre Duyarlılıklarının İncelenmesi. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 36(2) 189-198.
- Durmaz, A., & Kiriş Avaroğulları, A. (2016). Sosyal bilgiler derslerinde etkinlik uygulamalarının öğrenci motivasyonuna etkisi. *Turkish studies*, 11(3), 995-1010. <https://doi.org/10.7827/TurkishStudies.9409>
- Ek, N. H., Kılıç, N., Öğdüm, P., Düzgün, G., & Şeker, S. (2009). Adnan Menderes Üniversitesi'nin Farklı Akademik Alanlarında Öğrenim Gören İlk ve Son Sınıf Öğrencilerinin Çevre Sorunlarına Yönelik Tutumları ve Duyarlılıkları. *Kastamonu Eğitim Dergisi*, 17(1), 125-136.
- Erten, S. (2006). Çevre Eğitimi ve Çevre Bilinci Nedir, Çevre Eğitimi Nasıl Olmalıdır? *Çevre ve İnsan Dergisi*, 65/66, 2006/25.
- Esa, N. (2010). Environmental knowledge, attitude and practices of student teachers. *International Research in Geographical and Environmental Education*, 19, 39–50. <https://doi.org/10.1080/10382040903545534>
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education*. New York, N.Y.: McGraw Hill.

- George, D., & Mallory, M. (2010). *SPSS for Windows Step by Step: A Simple Guide and Reference*, 17.0 update (10a ed.) Boston: Pearson.
- Goldman, D., Yavetz, B., & Pe'er S. (2006). Environmental literacy in teacher training in Israel: Environmental behavior of new students. *Journal of Environmental Education*, 38(1), 3–22. <https://doi.org/10.3200/JOEE.38.1.3-22>
- Güneş, G. (2013). Toplumsal Cinsiyet ve Çevre. In G. Aras, L. Gültekin, G. Güneş, C. Ertung, & A. Şimşek (Eds.), *Toplumsal Cinsiyet ve Yansımaları* (pp. 17 – 46) İstanbul: Atılım Üniversitesi.
- Gwartney, J. D., Lawson, R. A., & Holcombe, R. G. (1999). Economic Freedom and the Environment for Economic Growth. *Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift Für Die Gesamte Staatswissenschaft*, (4), 643. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.40752161&lang=tr&site=eds-live>
- Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6(1), 53-60.
- Hsu, S. J. (2004). The effects of an environmental education program on responsible environmental behavior and associated environmental literacy variables in Taiwanese college students. *Journal of Environmental Education*, 35(2), 37–48. <https://doi.org/10.3200/JOEE.35.2.37-48>
- Hsu, S. J., & Roth, R. (1998). An assessment of environmental literacy and analysis of predictors of responsible environmental behavior held by secondary teachers in the Hualien area of Taiwan. *Environmental Education Research*, 4, 229–249. <https://doi.org/10.1080/1350462980040301>
- Hungerford, H. R., & Peyton, R. B. (1980). A paradigm for citizen responsibility: Environmental action. In A. B. Sacks, L. L. Burris-Bammel, C. B. Davis, & L. A. Iozzi (Eds.), *Current issues VI: The yearbook of environmental education and environmental studies* (pp. 146–154). Columbus, OH: ERIC Clearinghouse for Science, Mathematics and Environmental Education.
- Kahyaoğlu, M., Daban, Ş., & Yangın, S. (2008) İlköğretim Öğretmen Adaylarının Çevreye Yönelik Tutumları, *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, (11), 42-52.
- Kaplan, A. (1999). *Küresel Çevre Sorunları ve Politikaları*. Ankara: Mülkiyeliler Birliği Vakfı Yayınları Tezler Dizisi, 3.
- Karasar, N. (2012). *Bilimsel Araştırma Yöntemi: Kavramlar, İlkeler, Teknikler*. Ankara: Nobel Akademik Yayıncılık.
- Karasar, N. (2014). *Bilimsel Araştırma Yöntemi* (26th Edition), Ankara: Nobel.
- Kayalı, H. (2018). Din Kültürü ve Ahlak Bilgisi Öğretmen Adaylarının Çevre Okuryazarlığı Üzerine Bir Araştırma. *Marmara Coğrafya Dergisi*, (37), 63-69. <https://doi.org/10.14781/mcd.386113>
- Kayalı, H., (2010) Sosyal Bilgiler, Türkçe ve Sınıf Öğretmenliği Öğretmen Adaylarının Çevre Sorunlarına Yönelik Tutumları, *Marmara Coğrafya Dergisi*, (21), 258-268.
- Kılıç, S. (2006). Modern Topluma Ekolojik Bir Yaklaşım. *Kocaeli Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 2(12), 108-127.
- Koç, H., & Karatekin, K. (2013). Coğrafya Öğretmen Adaylarının Çevre Okuryazarlık Düzeylerinin Çeşitli Değişkenler Açısından İncelenmesi. *Marmara Coğrafya Dergisi*, (28), 139-174.
- Liarakou, G., Gavrilakis, C., & Flouri, E. (2009). Secondary school teachers, knowledge and attitudes towards renewable energy sources. *Journal of Science Education and Technology*, 18, 120–129. <https://doi.org/10.1007/s10956-008-9137-z>
- Miller, N. E., & Dollard, J. (1941). *Social Learning and Imitation*. New Haven, CT: Yale University Press.
- Özdemir, O. (2007). Yeni Bir Çevre Eğitimi Perspektifi: "Sürdürülebilir Gelişme Amaçlı Eğitim". *Eğitim ve Bilim Dergisi*, 32(145), 23-39.
- Pe'er, S., Goldman, D., & Yavetz, B. (2007). Environmental literacy in teacher training: Attitudes, knowledge and environmental behavior of beginning students. *Journal of Environmental Education*, 39(1), 45–59. <https://doi.org/10.3200/JOEE.39.1.45-59>
- Rodríguez-Campos, L. & Bombly, S. M. (2009). Teaching by example in collaborative evaluations. *International Journal of Learning*, 16(11), 453-464. <https://doi.org/10.18848/1447-9494/CGP/v16i11/46695>
- Sargin S., Baltacı F., Katipoğlu M., Erdik C., Arbatlı M., Karaardıç H., Yumuşak A., & Büyükcengiz M. (2016) Öğretmen Adaylarının Çevreye Karşı Bilgi, Davranış Ve Tutum Düzeylerinin Araştırılması. *M. Education Sciences (NWSAES)*, 11(1), 1-22. <https://doi.org/10.12739/NWSA.2016.11.1.C0650>

- Sia, A. P., Hungerford, H. R., & Tomera, A. N. (1986). Selected predictors of responsible environmental behavior: An analysis. *Journal of Environmental Education*, 17(2), 31–40. <https://doi.org/10.1080/00958964.1986.9941408>
- Spiropoulou, D., Antonakaki, T., Kontaxakaki, S., & Bouras, S. (2007). Primary teachers' literacy and attitudes on education for sustainable development. *Journal of Science Education and Technology*, 16, 443–450. <https://doi.org/10.1007/s10956-007-9061-7>
- Steiger, J. H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences*, 42(5), 893-898. <https://doi.org/10.1016/j.paid.2006.09.017>
- Stern, D., Common, M., & Barbier, E. (1996). Economic growth and environmental degradation: The environmental kuznets curve and sustainable development. *World Development*, 24(7), 1151–1160. [https://doi.org/10.1016/0305-750X\(96\)00032-0](https://doi.org/10.1016/0305-750X(96)00032-0)
- Stir, J. (2006). Restructuring teacher education for sustainability: Student involvement through a strengths model. *Journal of Cleaner Production*, 14, 830–836. <https://doi.org/10.1016/j.jclepro.2005.11.051>
- Sümer, N. (2000). Yapısal Eşitlik Modelleri: Temel Kavramlar ve Örnek Uygulamalar. *Türk Psikoloji Yazılıları*, 3(6), 49-74.
- Şimşek, Ö. F. (2007). *Yapısal Eşitlik Modellemesine Giriş Temel İlkeler ve LISREL Uygulamaları*. Ankara: Ekinox.
- Tabachnick, B. G., & Fidell, L. S. (2013) *Using multivariate statistics* (6th ed.), Boston: Pearson.
- Teksöz, G., Şahin, E., & Ertepınar, H. (2010). Öğretmen Adayları Ve Sürdürülebilir Bir Gelecek. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 39(39), 307-320.
- Timur, S., Yılmaz, Ş., & Timur, B. (2013). İlköğretim Öğretmen Adaylarının Çevreye Yönelik Tutumlarının Belirlenmesi ve Farklı Değişkenlere Göre İncelenmesi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, 14(2), 191-203.
- Velasquez, H. R. (2011). *Pollution Control: Management, Technology and Regulations*. New York: Nova Science Publishers, Inc. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=400790&lang=tr&site=eds-live>
- Vurgun, A. (2017). *II Abdülhamit döneminde ahlak eğitimi*. İstanbul: Yeditepe
- Zara, A., & Özdemir, B. (2013) Cinsiyet Roller. In Ş. Yüksel, L. Gülsen & A. D. Baştürki, (Eds). *Kadınların yaşamı ve kadın ruh sağlığı* (pp. 3-12) Ankara: *Türk Psikiyatri Derneği Yayımları*.

